MODIFICATION OF THE WENHAM HALF-DISC ILLUMINATOR, WITH AN IMPROVED MOUNTING.

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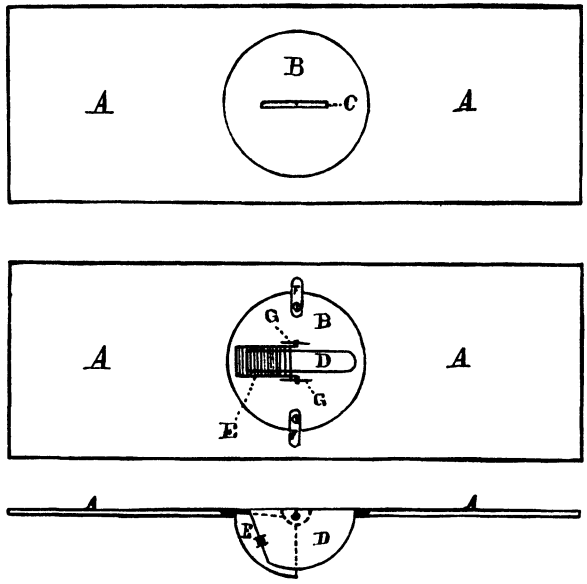
About the time of the publication, in the *American Journal of Microscopy*, of an article on the Wenham Half-disc Immersion Illuminator, together with the formula for making this device, I constructed two of these ingenious little illuminators, and was so well pleased with the results of their use that I designed and made two more (they are more easily made in pairs), double the size of those first constructed, so that a much greater amount of light could be projected upon the object under examination, and that higher powers, both of eye-pieces and objectives, might be used with sufficient light for the proper illumination of the object. While resolving the markings upon various forms of the *Diatomaceæ*, I found it necessary to interpose an opaque screen between the lamp and the object, to prevent the diffused rays of light from the lamp being condensed upon the object, which, to a certain extent, nullified the rays of light from the mirror, which were used for the illumination of the object.

While seeking to evolve some plan by which this diffused light might be prevented from interfering with the resolution of lined or dotted objects, I had recourse to the V-shaped diaphragm made from photographers' ferro-plate, and attached to the under side of the stage of the microscope. I soon became convinced that the

improved resolution of the markings upon diatoms, when this form of diaphragm was used, consisted not so much in its cutting off the less oblique pencils of light reflected from the mirror, but in the total exclusion of the diffused rays emanating from the source of illumination. The accompanying diagram, which gives an upper, lower and side view of the device, illustrates a simple and effectual method of mounting the modified illuminator, by which the benefits arising from the use of the Wenham half-disc are combined with those of the Woodward prism and V or shutter-diaphragm in a single apparatus. To prevent the half-disc sliding from its position when attached to the under surface of an object-slide by an immersion fluid, and also to obviate the necessity for a rearrangement of the mirror every time the slide was moved, a stationary fitting seemed requisite.



A brass slide, three by one inch in length and width (A A), was thought to be the best form of mounting for the illuminator. A circular piece of brass (B) was then made, fitting an opening of the same size in the brass slide; it was kept in position by the two movable supports (F F), which, while holding the brass disc in its place, allowed it to be freely revolved in a plane with the slide. In the

brass disc an opening was made exactly fitting the illuminator (D), one side of which (H) was ground to a plane surface at an angle of 68°, to accommodate the extreme angle of aperture of my $\frac{1}{10}$-inch objective. A shutter-diaphragm (E) was then attached to the ears (G G), from which points it could be swung to shut off the light from either the plane or lenticular surface of the illuminator. The revolution of the brass disc allowed either side of the glass disc to be presented to the source of illumination. A slit diaphragm (C), cut through very thin brass, immediately surmounts the modified illuminator and completes this simple device, by which a Woodward prism, Wenham half-disc, shutter-diaphragm and revolving fitting are combined in an effective manner.